

**39th CONFERENCE OF THE DIRECTORS GENERAL
OF CIVIL AVIATION
ASIA AND PACIFIC REGIONS**

**Cebu City, Philippines
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Agenda Item 4: CNS/ATM Implementation Activities

**ASIA PACIFIC ECONOMIC COOPERATION GNSS IMPLEMENTATION TEAM
PROGRAM STATUS**

INFORMATION PAPER

(Presented by the United States of America)

SUMMARY

This paper provides information on the GNSS implementation efforts of the Asia Pacific Economic Cooperation (APEC) Satellite Navigation & Communication (SN&C) Advisory Committee including establishment of the Global Navigation Satellite System (GNSS) Implementation Team (GIT).

1.0 ASIA PACIFIC ECONOMIC COOPERATION

1.1 The Asia-Pacific Economic Cooperation (APEC) was established in 1989 in response to the growing interdependence among Asia-Pacific economies. Begun as an informal dialogue group, APEC has since become the primary regional vehicle for promoting open trade and practical economic cooperation. Its goal is to advance Asia-Pacific economic dynamism and sense of community. The APEC Transportation Working Group addresses safety and security across all modes of transportation including environmental considerations, and the adoption of new technologies supported by the Satellite Navigation and Communications Systems (SN&C) Advisory Committee.

1.2 The 21 participating nations of APEC are: Australia; Brunei; Canada; Indonesia; Japan; Republic of Korea; Malaysia; New Zealand; the Philippines; Singapore; Thailand; the United States; the People's Republic of China; Hong Kong, China; Chinese Taipei; Mexico; Papua New Guinea; Peru; Chile; Russia; and Vietnam.

1.3 Most of the APEC nations have already stated their individual (and regional) commitment to implement GPS-based navigation technologies and some of these economies have begun or have already established a test bed. The underlying challenge that remains is to bring the individual implementation efforts currently being planned and executed within the region into a single, cohesive effort to provide a regional satellite navigation capability for all phases of flight. To facilitate and expedite this transition to satellite navigation within APEC, the FAA has provided technical assistance in the development of a common direction and general implementation path in regards to GPS and its augmentation technologies.

2.0 APEC GNSS IMPLEMENTATION TEAM (GIT)

2.1 The Group of Experts on Global Navigation Satellite Systems (GNSS) Implementation was formed during the Satellite Navigation & Communications (SN&C) Systems Advisory Committee meeting held in conjunction with the TPTWG-17 (March 2000). The group's mission is to promote implementation of regional GNSS augmentation systems to enhance inter-modal transportation and recommend actions to be considered by the Advisory Committee in the Asia Pacific region. The experts group aims to assist economies implement GPS as a supplemental and/or primary means of navigation for en-route, terminal, and non-precision approaches and is preparing an analysis and an action plan leading to regional GNSS implementation.

3.0 GNSS IMPLEMENTATION REGIONAL MEETINGS

3.1 As part of these initiatives and to launch the regional test bed initiative in the Asia Pacific region, one hundred participants from eleven economies (Japan; Hong Kong, China; Philippines, Malaysia, Brunei; The Russian Federation; Chinese Taipei; Australia, Peru, Thailand, and United States) and the International Civil Aviation Organization (ICAO) participated in four GNSS Implementation Regional meetings held August 27-September 8, 2001.

3.2 These regional meetings were held in Tokyo, Hong Kong, Manila and Bangkok, August 27-September 8, 2001 and provided information on the benefits of test bed technology and applications for the region's architecture, how to establish the capability in the region, and steps to test and evaluate the system. These regional meetings are part of the continuing effort to foster implementation initiatives as put forth by the SN&C Advisory Committee and the Group of Experts on GNSS Implementation.

3.3 These regional meetings resulted in the renaming of the Group of Experts on GNSS Implementation to the GNSS Implementation Team (GIT), which is made up of experts group members who considered the new name to be more representative of what the original group had been tasked to accomplish.

4.0 GIT/1 MEETING

4.1 The GIT met February 26-March 1, 2002 in Los Angeles, California, to address developing an APEC GNSS Test Bed Plan, its initial architecture, and roles and responsibilities of the group. The meeting was co-hosted by industry partners, Boeing and Raytheon, which also provided a comprehensive review and detailed technical site visits of their operational and manufacturing facilities. Forty-two participants from nine economies (Australia; Hong Kong, China; Japan; Malaysia; New Zealand; the Philippines; Chinese Taipei; Thailand; and the United States), the International Air Transport Association (IATA), and the International Civil Aviation Organization (ICAO) participated in the first GIT meeting. The meeting included GNSS status reports from the participating economies and produced the following outcomes:

4.1.1 Members developed a draft statement on the GIT's goals and objectives, terms of reference, and a work program that supports the TPT-WG's continuing efforts to enhance international aviation using new technologies and to encourage GNSS implementation to promote safety and efficiency.

4.1.2 The APEC GNSS Implementation Team (GIT) will work to implement the agreed upon GNSS work program for the Asia Pacific region. The group consists of experts from the economies that will work together to develop a test bed implementation plan, site installation schedule, and testing and evaluation of the system. The GIT also includes industry participants, the International Civil Aviation Organization (ICAO), the International Air Transport Association (IATA) and the International Maritime Organization (IMO) as well as the FAA that will also provide technical assistance to this initiative.

5.0 GIT/2 MEETING

5.1 The second meeting of the GIT was held September 18-20, 2002 at the Sheraton Brisbane Hotel in Brisbane, Australia. The Australian Federal Department of Transport and Regional Services hosted the meeting. Thirty-seven participants from ten economies (Australia; China; Hong Kong, China; Japan; New Zealand; Peru; Philippines; Chinese Taipei; Thailand; and the United States), Industry (Qantas, Raytheon, ISI, Mitre, NEC) and the International Civil Aviation Organization) participated.

- 5.1.1 The GIT/2 meeting included Global Navigation Satellite System (GNSS) status reports from the participating economies and the International Civil Aviation Organization (ICAO) as well as discussing funding sources that could be utilized to begin implementing the GIT work program.
- 5.1.2 The GIT members agreed to develop a draft terms of reference for a Communications, Navigation, and Surveillance and Air Traffic Management (CNS/ATM) Feasibility Study for the Asia Pacific Region.
- 5.1.3 Members of the GIT would research funding opportunities that may be available in their economies and discuss these at GIT/3.

5.2 Based on the GIT's decision and the APEC Satellite Navigation & Communications (SN&C) Systems Advisory Committee's concurrence to move forward with GNSS, the following work program was endorsed at both the TPTWG-20 meeting in Manila and TPTWG-21 in Brisbane:

- Facilitate an incremental approach for use of GNSS systems for multi-modal transportation as validated by cost benefit analysis of SN&C system components;
- Assist economies to implement GNSS as a supplemental and/or primary means of air navigation;
- Assist economies to implement test reference stations to encourage data collection and analysis and share those results;
- Provide an analysis on the current status of GNSS across all transportation modes and determine opportunities to utilize GNSS technology;
- Encourage the shared use of GNSS facilities and services wherever economically and operationally beneficial; and
- Promote collaborative research projects, education, and information exchange in all areas related to evolving GNSS technologies.

- 5.2.1 Based on this work program, the near term objectives for the economies include completing WGS-84 surveys, approving the use of basic GPS, developing and approving GPS procedures, and begin establishing a regional test bed.

5.3 GIT/3 to be hosted by the Japan Civil Aviation Bureau (JCAB), February 26-28, 2003 in Kobe, Japan.

6.0 CONCLUSION

6.1 The history of the development of air traffic management systems and their relationship to aviation safety will show a compelling argument for moving forward with satellite navigation. Today's ground based navigation equipment and procedures, although sophisticated and technologically advanced, result in only modest increases in overall system safety. While these systems will continue to play an important role during the transition to a future satellite-based operating environment, *the next level of aviation safety can not be achieved without satellite navigation.*

6.2 The United States is committed to working with other countries, economies and international organization for the implementation of a seamless satellite navigation and positioning system that transcends national boundaries and improves aviation safety and efficiency worldwide. As more countries begin establishing both Satellite Based Augmentation Systems (SBAS) and Ground Based Augmentation Systems (GBAS), there is a commonly recognized need to establish and maintain adequate cooperation/coordination among SBAS providers so their implementation becomes more effective and part of a seamless worldwide navigation system. It is hoped that these cooperative efforts among SBAS providers will lead to improved service outside and in between the nominal service volumes of each SBAS provider.

6.3 The meeting is requested to note the material presented in this information paper, and consider its contribution to an increase in safety and system efficiency within the region. Meeting attendees are also invited to visit the FAA's International Research and Acquisition website at <http://www.faa.gov/asd/international/apec.htm> for information on the GIT or the APEC website at: http://www.iot.gov.tw/apec_tptwg.